Received: 15th July 2015 Accepted: 18th October 2015 Conflicts of Interest: None

Source of Support: Nil

Original Research

Prevalence of Dental Caries among Preschool Children in Qazvin, Iran: School Screening Programs

Jalaleddin H Hamissi

Contributor:
Associate Professor, Department of Periodontics and Dental Caries, Prevention, Qazvin University of Medical Sciences, Qazvin, Iran.

Correspondence:
Dr. Hamissi JH. Dental Caries, Prevention Research Center, College of Dentistry, Qazvin University of Medical Science, Shaheed Bahonar Blv, Qazvin, 34197-59811, Iran. Tel.: +(0)989121812543. Email: jhamissi@qums.ac.ir

How to cite the article:
Hamissi JH. Prevalence of dental caries among preschool children in Qazvin, Iran: School screening programs. J Int Oral Health 2015;7(12):5-9.

Abstract:

Background: Dental caries is extremely prevalent and one of a significant public health problem among children throughout the world. Data regarding the prevalence of dental caries among Iranian preschool children are very limited. The objective of this research is to determine the frequency of dental caries among preschool children of Qazvin, Iran and the related factors to caries.

Subjects and Methods: A census study of 4701 preschool children age 6 years old from Qazvin, and the surrounding area was conducted. Name, age, gender, address, and caries status each subject was recorded. Intra-oral examinations were performed using a mirror and probes X-rays were not taken to diagnose caries. The dental examination was conducted by 14 calibrated examiners accordance with the World Health Organization guidelines. The decayed missed filled teeth (DMFT).

Results: Out of 4701 preschool children examined, 2302 were girls (49%) and 2399 (51%) boys. The total caries prevalence in the study population was 68.1% with an overall mean dmft score of 3.167 (±3.003) of which decayed component comprised of 2.67 (±2.78), missing component 0.151 (±0.530), and filled component only 0.342 (±1.05). The mean dmft of males were 3.23 (±3.07) and of females was 3.09 (±2.93).

Conclusion: The present study showed that the frequency of caries was found to be a higher than reported is unexpectedly high among the age group investigated in our research. According to the high prevalence obtained in our study, health recommendations on oral hygiene to target population and also parents and teachers should be made.

Key Words: Decayed missed filled teeth, dental caries, epidemiology, Iran, mixed dentition, preschool children, prevalence

Introduction

One of the effective methods for improving the health status of individuals is health promotion program.[1] Moreover, schools are considered as perfect settings for this matter.[2,3] Most countries have established screening programs to implement health in their educational system as well as to recognize children, who have early signs of health problems. The number of countries that have applied school health screening program is increasing,[4-7] which may allow early intervention and experts' treatment. Oral diseases are characterized as one of major public health issue due to the high occurrence and high treatment cost.[8] In daily lives, dental caries, periodontal disease, tooth loss and mucosal lesions affect serious functions, such as eating, chewing and swallowing. In addition, they may affect with the important social functions of smiling and communication, affecting quality of lifecycle.[9-11]

The epidemiological studies are so necessary for the oral health evaluation in a population.[12] The World Health Organization (WHO) has clearly recommended carrying out such investigation.[13] Increasing number of studies around the world have demonstrated a direct relationship between various behavioral, social, economic, clinical factors, and dental caries. Among these factors, studies have shown that tooth brushing and oral hygiene behavior in children is related with dental caries experience.[14-17]

Dental caries is widespread prevalent among children and perseveres to be a significant public health problem.[18] It has adverse consequences on children's quality of life by imposing pain, premature tooth loss, and malnutrition and lastly effects overall growth.[19] The children suffering from poor oral health are 12 times more likely to have limited activity days as a compared with others.[13] The prevalence of dental caries among preschool children of developed countries has been declining over the past few decades. However, current evidence presented that this decline has stopped in certain developed countries,[20,21] but the incidence is still so high among preschoolers in developing nations.[22-24]

Furthermore, some socio-demographic and behavior indicators that disposed to an individual to increased caries experience comprise: Presence of dental plaque, poor oral hygiene, growing age, gender, insufficient tooth-brushing habits, frequency consumption of sugar containing drinks.[25,26] Dental caries is one of preventable disease and if the burden of factors leading to such condition then better health education activities be planned. The documentation of high-risk groups provides motivation to community awareness and its involvement in preventive efforts; as well as re-orients oral health services toward oral health promotion.[27,28]

There is a lack of updated data about the prevalence of dental caries among Iranian preschool children particularly in this region under study.

The reason for this neglect may be either the perception that primary teeth are not as important as the permanent. An estimate of dental caries prevalence in preschool children would be beneficial to employ control as well as protective measures at an early age of the child, improved dental health status, retaining of teeth for a longer duration, and enable them to lead a good quality life. Hence, aim this study is; to measure the frequency of dental caries and secondly, to identify the factors related to caries burden among children.

Subjects and Methods

Study population and sampling method

A study of incidence of dental caries of school going children of Qazvin are undertaken by the health department of Qazvin University of Medical Sciences, in nine health center clinic in district to assess the occurrence of dental caries in relation to numerous risk factors. The study was lead in 2399 boy and 2302 girl preschool children residing in Qazvin. The schools were selected based on the housing place status. Children belonging to the low socioeconomic groups may those studying in the government schools and the high socioeconomic group comprised of children studying in private schools. The criteria for selection of the study subjects should be permanent residents of Qazvin.

The study population consisted of 2399 (51%) boys and 2302 (49%) girls. The protocols were approved by the Institutional Review Board of Qazvin University of Medical Sciences in accordance with the Declaration of Helsinki. The children and their parents were informed of the nature of the study, and a consent form was signed by each participant's parents. The clinical examination was performed in the nearest health center to their house.

Clinical examinations

The clinical dental examination was carried out by 14 trained dentist using criteria of Intentional Caries Detection and Assessment System. Recording of data was done by trained person in each health center clinic, who assisted throughout the investigation. The subject was examined on an upright chair in the passable natural light.

The clinical examinations were performed in the clinic, with the child sitting on a chair, facing away from the examiner and reclining to rest her or his head on a cushion placed on the examiner's lap. Cotton rolls were used to clean the teeth and to control saliva. Not more than 25 children were examined during one meeting to avoid the effects of visual fatigue. The examination instruments employed were the WHO type periodontal probe and a no. 5 plain mouth mirror. Each examination team was delivered with 35 sets of sterilized probes and mirrors, each in a sealed bag, and placed in a portable plastic container.[29] The research work was carried out during 2012-2013.

The decayed missed filled teeth (dmft) score for each child was calculated, and teeth lost as a result of trauma or exfoliations were excluded from the calculation. A tooth was measured missing if there was a history of extraction because of pain and/or the presence of a cavity prior to extraction. Data collections were according to the guidelines published by British Association of the Study of Community Dentistry.[30]

Measurements: Caries

The criteria recognized by the WHO[29,31] were employed for the diagnosis and coding of all the tooth surfaces examined. Previous to the examination for plaque and dental caries, a questionnaire was filled by the parents to find out the personal data and oral hygiene habits. Tooth surface was dried, and plaque scores were recorded first, prior to the examination of dental caries using plaque modified Silness and Löe and deft and DMFT indices, respectively. Standardization measures were performed prior to and during the study to ensure that a consistent standard of the diagnosis was maintained.

Statistical analysis

Data were entered using the EPIINFO computer program and moved to the SPSS Version 21 program for analyses of Census test. The data remained statistically analyzed with *t*-test. Statistical significance was inferred if $P < 0.05$.

Ethical aspects

The procedures, possible discomforts, and risks were fully explained to the children and their parents or guardians, and written consent was obtained prior to the investigation.

Results

Out of 4701 preschool children examined, 2302 were girls (49%) and 2399 (51%) boys (Graph 1). The overall caries study population was 68.1% with a general mean dmft score of 3.167 (±3.003) of which decayed component comprised of 2.67 (±2.78), missing component 0.151 (±0.530) and filled component only 0.342 (±1.05) (Table 1).

The mean dmft of males was 3.253 (±3.07) and of females was 3.095 (±2.93) not significant differences were found ($P > 0.05$) between boys and girls. In Table (2) shown the prevalence of DMFT in deciduous teeth. In Table (3) shown the prevalence

Table 1: The mean DMFT index in permanent teeth school children attributed to gender.

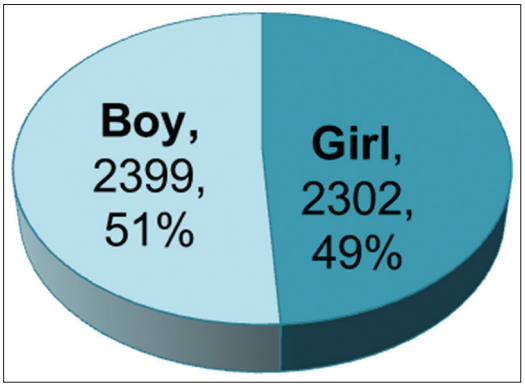
DMFT	DMF±SD	D±SD	M±SD	F±SD
Total	3.167+3	2.67+2.78	0.151+0.53	0.34+1.05
Girl	3.095±2.93	2.634±2.74	0.139±0.508	0.322±0.999
Boy	3.253±3.07	2.71±2.82	0.163±0.550	0.362±1.10
t-test	*P*>0.05	*P*>0.05	*P*>0.05	*P*>0.05

DMFT: Decayed missed filled teeth, SD: Standard deviation

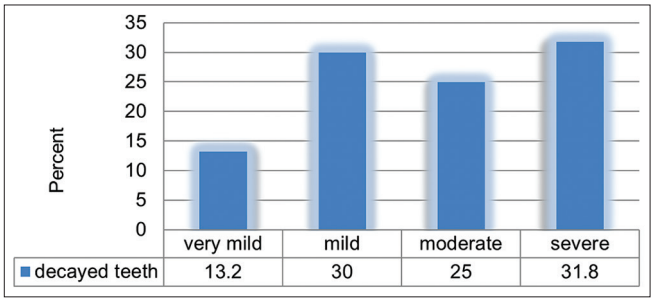
of DMFT in permanent teeth. Among the children with clinical caries, mean dmft score was 4.37 with dt 3.92, mt 1.49 and ft 2.47 individually. The percentage of caries positive males was 71.86% and females were 72.76% while the mean dmft of caries positive males were 4.5 and of caries positive females were 4.25. Out of 72.3% children who had clinically decayed teeth, 13.2% had one tooth involved (very mild), 30% had 2-3 teeth involved (mild), 25% had 4-5 teeth (moderate), whereas children who had more than 6 decayed teeth (severe) were only 31.8% (Graph 2).

Discussion

To the best of our knowledge and information, the current investigation was one of the few Iranian studies that provide the first estimates of previously undiagnosed health disorders among preschool children, the west of Iran in the year 2012. While the nationwide report of the occurrence of common disorders using school health screening program were formerly published.[32] Oral health is a part of general health and, therefore, affects the total well-being of persons. Dental and oral diseases influence various aspects of quality of life.[33] Although the need to conduct yearly oral health morbidity assessments to aid in planning and studying of oral health services, dental data of Ugandan inhabitants is revealing due to limited research in the dental discipline. This reports indicated that the oral hygiene of primary school children was poor with a high occurrence of dental plaque reflecting a lack of established oral hygiene practices. Plaque incidence among the 5-6 years old reported here is about 2 times that stated among the 5 years old.[34]



Graph 1: Frequency of boy and girl graph.



Graph 2: Frequency of severity of teeth in children who had clinically decayed .

Dental caries is defined traditionally using the increasing history of the disease. The index used in an individual is the sum of DMFT due to decay. This index summaries the total experience of dental caries up to the time of assessment.[35,36]

The lack of fundamental epidemiological information about dental caries among adolescents establishes a serious limitation due to two main reasons. Initially, to preserve adequate investigation of dental caries it is so important to know its behavior in different age-groups. The secondly, with the decline of dental caries in numerous countries, including Iran, the chances of extending oral health care to other groups of the people, such as teenagers and young adults, has increased significantly.[18] The results established increase frequencies of caries. The high levels of disease seen are in agreement with the result of previous studies.[37,38] The statistics of this study revealed that approximately half of 3-6 years old study populace suffered from dental caries in their primary dentition; hence, it is defensible to state that we are in line with WHO/FDI goals for 2000, i.e. 50% of 5-6 years old children should be caries free.[28]

Conclusion

Within the limits of this study, participation of school dental services should be directed to:

1. Oral hygiene instructions should be given to children and parents, to motivate self-care and prevent dental caries
2. According to this investigation, it was shown that necessary dental health programs (providing tooth brushing instruction to children, Dental health education instructions in nutrition and nutritional habits), introduction of fissure sealants in newly erupted teeth in susceptible patients, prophylaxis with fluoride prophylaxis paste at least once a year, need to attain the required oral care among the school children of Qazvin. Further national surveys are desired to evaluate the occurrence of dental caries and treatment needs to properly monitor the oral health programs.
3. The results of this investigation indicate that the increasing

Table 2: Prevalence of DMFT index in permanent teeth school children attributed to gender.

Permanent	DMF±SD	D±SD	M±SD	F±SD
Total	0.0555±0.401	0.0487±0.358	0.0015±0.526	0.0053±0.131
Girl	0.0682±0.440	0.0626±0.421	0.0013±0.0467	0.0043±0.121
Boy	0.0434±0.359	0.0354±0.284	0.0017±0.0577	0.0063±0.139
t-test	*P*>0.05	*P*>0.05	*P*>0.05	*P*>0.05

DMFT: Decayed missed filled teeth, SD: Standard deviation

Table 3: Prevalence of DMFT index in deciduous teeth school children according to gender.

Deciduous	DMFT±SD	D±SD	M±SD	F±SD
Total	3.111±2.94	2.624±2.725	0.15±0.526	0.337±1.033
Girl	3.027±2.863	2.572±2.670	0.138±0.507	0.318±0.988
Boy	3.191±3.014	2.674±2.778	0.162±0.543	0.356±1.074
t-test	*P*>0.05	*P*>0.05	*P*>0.05	*P*>0.05

DMFT: Decayed missed filled teeth, SD: Standard deviation

incidence of dental caries in Qazvin province; it highlights the need for a dental health program to target this specific section of the population through systematic public and school based oral health promotion. Parents could also have benefit from oral health education and the need of regular dental follow-ups with nutritional instructions to maintain good oral hygiene.

4. The comprehensive and active strategies will be required to decrease the sugar consumption among children. It may also be concluded that time of tooth brushing to achieving the proper oral hygiene should be emphasized.

Limitations

Since this was a cross-sectional investigation, so it cannot establish temporal associations. In this respect future longitudinal studies are recommended to establish causal relations for risk factors with dental caries. Moreover, true results might have been disadvantaged due to incorrect reporting (reporting bias) by the young children, as well as incapability to interview the parents regarding their children's oral behaviors.

Recommendations

1. Timely referral and restorative management of children suffering from dental caries would reduce the load of disease
2. A multispectral approach involving the country's health and education department, public and private schools, non-government agencies, dental community as well as pharmaceuticals related to dental field should be implicated to highlight the issue of tooth decay and its damaging consequences on children's quality of life among the general public and thereby, designing and realizing effectual mass preventive and curative approaches.

Acknowledgments

I am indebted to the health center clinic staff, the children and parents without their enthusiasm and willing cooperation this investigation would not have been possible. The author would like to express their gratitude to: Dr. Mahmud Abdi, Dr. Mohammad Abdullahi, Dr. Mohammad Hoseinian Dylami, Dr. Majeid Hasanpour, Dr. Hojatollah Jalali Yekta, Dr. Mohsen Jolokhani, Dr. Soliman Meheralian, Dr. Ali Reza Mohammadi, Dr. Mahmud Rajabi, Dr. Fariba Razavi, Dr.Habib Shojaei Nejad, Dr. Borzo Solaimani, Dr. Akbar Yousefi, for their help and patience in clinical examination assistance during the organization of the study. Especial thanks to Dr. Ali Reza Mehralian for his cooperation and effort in data collection. Thanks to Mrs. Addeleh Ghoudosi for her statistical analysis.

References

1. World Health Organization. The Bangkok Charter for Health Promotion in a Globalized World, WHO; 2005. Health Promotion International Volume 21 Supplement 1 December 2006. Available from: http://www.heapro.oxfordjournals.org.
2. St Leger L, Young IM. Creating the document 'Promoting health in schools: From evidence to action'. Glob Health Promot 2009;16(4):69-71.
3. Austin SB, Fung T, Cohen-Bearak A, Wardle K, Cheung LW. Facilitating change in school health: A qualitative study of schools' experiences using the School Health Index. Prev Chronic Dis 2006;3:A35.
4. Sekhar DL, Zalewski TR, Paul IM. Variability of state school-based hearing screening protocols in the United States. J Community Health 2013;38(3):569-74.
5. Opubiri I, Pedro-Egbe CN. Screening of primary school children for refractive error in South-South Nigeria. Ethiop J Health Sci 2012;22(2):129-34.
6. Kondapaneni SL, Surpam R; Mohd Azaruddin, Devi G. Screening for asymptomatic bacteriuria in school-going children. Indian J Public Health 2012;56(2):169-70.
7. Madsen KA, Linchey J. School-based BMI and body composition screening and parent notification in California: Methods and messages. J Sch Health 2012;82(6):294-300.
8. Marcenes W, Kassebaum NJ, Bernabé E, Flaxman A, Naghavi M, Lopez A, *et al.* Global burden of oral conditions in 1990-2010: A systematic analysis. J Dent Res 2013;92:592-7.
9. Martins-Júnior PA, Vieira-Andrade RG, Corrêa-Faria P, Oliveira-Ferreira F, Marques LS, Ramos-Jorge ML. Impact of early childhood caries on the oral health-related quality of life of preschool children and their parents. Caries Res 2013;47(3):211-8.
10. Fontana M, Jackson R, Eckert G, Swigonski N, Chin J, Zandona AF, *et al.* Identification of caries risk factors in toddlers. J Dent Res 2011;90(2):209-14.
11. Hamissi J, Hamissi H. Prevalence of dental caries among elementary school attendees in Iran. East Afr J Public Health 2010;7(4):338-41.
12. Burt BA. How useful are cross-sectional data from surveys of dental caries? Community Dent Oral Epidemiol 1997;25(1):36-41.
13. Currie C, Hurrelmann K, *et al.* Health policy for children and adolescents. Health and Health Behaviors among Young People, WHO Policy Series. International Report. Copenhagen: WHO Regional Office for Europe; 2000. Available from: http://www.euro.who.int/__data/assets/pdf_file/0006/119571/E67880.pdf. [Last accessed on 2011 Apr 30].
14. Vanobbergen J, Martens L, Lesaffre E, Bogaerts K, Declerck D. Assessing risk indicators for dental caries in the primary dentition. Community Dent Oral Epidemiol 2001;29:424-34.
15. Casanova-Rosado AJ, Medina-Solís CE, Casanova-Rosado JF, Vallejos-Sánchez AA, Maupomé G, Avila-Burgos L. Dental caries and associated factors in Mexican schoolchildren aged 6-13 years. Acta Odontol Scand 2005;63:245-51.
16. Hallett KB, O'Rourke PK. Dental caries experience of preschool children from the North Brisbane region. Aust Dent J 2002;47:331-8.

17. Bagramian RA, Garcia-Godoy F, Volpe AR. The global increase in dental caries. A pending public health crisis. Am J Dent 2009;22:3-8.
18. Hamissi J, Ramezani GH, Ghodousi A. Prevalence of dental caries among high school attendees in Qazvin, Iran. J Indian Soc Pedod Prev Dent 2008;26 Suppl 2:S53-5.
19. Kwan SY, Petersen PE, Pine CM, Borutta A. Health-promoting schools: An opportunity for oral health promotion. Bull World Health Organ 2005;83:677-85.
20. Pitts NB, Chestnutt IG, Evans D, White D, Chadwick B, Steele JG. The dentinal caries experience of children in the United Kingdom, 2003. Br Dent J 2006;200(6):313-20.
21. Hugoson A, Koch G, Helkimo AN, Lundin SA. Caries prevalence and distribution in individuals aged 3-20 years in Jönköping, Sweden, over a 30-year period (1973-2003). Int J Paediatr Dent 2008;18(1):18-26.
22. Wyne AH. Caries prevalence, severity, and pattern in preschool children. J Contemp Dent Pract 2008;3:024-31.
23. Askarizadeh N, Siyonat P. The prevalence and pattern of nursing caries in preschool children of Tehran. J Indian Soc Pedod Prev Dent 2004;22(3):92-5.
24. Begzati A, Meqa K, Siegenthaler D, Berisha M, Mautsch W. Dental health evaluation of children in kosovo. Eur J Dent 2011;5(1):32-9.
25. Declerck D, Leroy R, Martens L, Lesaffre E, Garcia-Zattera MJ, Vanden Broucke S, *et al.* Factors associated with prevalence and severity of caries experience in preschool children. Community Dent Oral Epidemiol 2008;36(2):168-78.
26. Rajab LD, Petersen PE, Baqain Z, Bakaeen G. Oral health status among 6- and 12-year-old Jordanian schoolchildren. Oral Health Prev Dent 2014;12(2):99-107.
27. Llompart G, Marin GH, Silberman M, Merlo I, Zurriaga O; GIS (Grupo Interdisciplinario para Salud). Oral health in 6-year-old schoolchildren from Berisso, Argentina: Falling far short of WHO goals. Med Oral Patol Oral Cir Bucal 2010;15(1):e101-5.
28. Sufia S, Chaudhry S, Izhar F, Syed A, Mirza BA, Khan AA. Dental caries experience in preschool children: Is it related to a child's place of residence and family income? Oral Health Prev Dent 2011;9(4):375-9.
29. World Health Organization. Oral Health Surveys, Basic Methods, 4th ed. Geneva: World Health Organization; 1997.
30. Pitts NB, Evans DJ, Pine CM. British Association for the Study of Community Dentistry (BASCD) diagnostic criteria for caries prevalence surveys-1996/97. Community Dent Health 1997;14 Suppl 1:6-9.
31. Nishi M, Stjernswärd J, Carlsson P, Bratthall D. Caries experience of some countries and areas expressed by the Significant Caries Index. Community Dent Oral Epidemiol 2002;30(4):296-301.
32. Amirkhani M, Alavian S, Dashti M, Aminaie T, Ardalan G, Ziaoddini H, *et al.* Nationwide report on the findings of integrated school health screening program in iran. Iran J Public Health 2010;39(2):13-7.
33. Truin GJ, König KG, Kalsbeek H. Trends in dental caries in The Netherlands. Adv Dent Res 1993;7(1):15-8.
34. Kiwanuka SN, Astrøm AN, Trovik TA. Dental caries experience and its relationship to social and behavioural factors among 3-5-year-old children in Uganda. Int J Paediatr Dent 2004;14(5):336-46.
35. Zhang S, Liu J, Lo EC, Chu CH. Dental caries status of Dai preschool children in Yunnan Province, China. BMC Oral Health 2013;13:68.
36. Masood M, Yusof N, Hassan MI, Jaafar N. Assessment of dental caries predictors in 6-year-old school children - results from 5-year retrospective cohort study. BMC Public Health 2012;12:989.
37. Zhang S, Liu J, Lo EC, Chu CH. Dental caries status of Bulang preschool children in Southwest China. BMC Oral Health 2014;14:16.
38. Wyne A, Darwish S, Adenubi J, Battata S, Khan N. The prevalence and pattern of nursing caries in Saudi preschool children. Int J Paediatr Dent 2001;11(5):361-4.